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10/519,030	12/22/2004	Andreas Muhlebach	SE/25-22707/A/PCT	7050

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EXAMINER

WYROZEBSKI LEE, KATARZYNA I

ART UNIT	PAPER NUMBER
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1796

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06/02/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/519,030	Applicant(s) MUHLEBACH ET AL.	
	Examiner Katarzyna Wyrozebski	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/23/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

Specification

According to oath and declaration, instant invention is 371 of PCT/EP03/06370 filed 6/17/2003 (In English). According to the USPTO rules, this information is to be included in first paragraph of the instant invention.

Claim Objections

1. Following claims are objected to because of the following informalities:

Claim 1 contains limitation of R9, yet R9 is not utilized in claim 1 (not until claim 2).

Claim 3 contains limitation of T8, which is not defined.

Claim 10 (on page 57 first line) there should be a space between “x” and “is”.

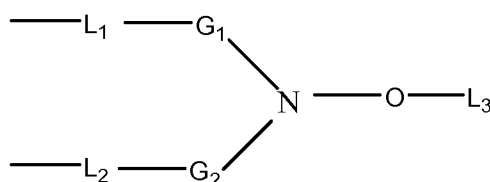
Claim 18 discloses list of claims which can be considered narrow within broad limitations since smectite clays also known as phyllosilicate include montmorillonite, saponite, beidelite and the like.

Appropriate correction is required.

Claim Interpretation

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According to applicant's claim 1, p, q and r can be 0-10 with at least one being different than 0 and L3 being group capable of polymerizing ethylenically unsaturated monomer. Therefore the simplest formula according to (I) is:



Wherein Group (Q^+X^-) is present at one of the L₁, L₂ or L₃.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1, 11-15, 17-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over GIANNELIS et al. (*J. Am. Chem. Soc.* **1999**, *121*, 1615-1616).

The prior art of GIANNELIS discloses polymerization process *via* living free radical polymerization, utilizing silicate anchored initiator, which polymerization results in formation of nanocomposite. According to GIANNELIS such nanocomposite is suitable for use in coatings, moldings and the like.

Silicate of GIANNELIS is swellable silicate, capable of being cationically exchanges and eventually delaminated. Col. 2 of the article discloses mica and montmorillonite as two silicates suitable for such process. Specifically silicate is unmodified.

Initiator, is alkoxy amine initiator that fits requirements of most basic, instant formula I. The initiator is protonated such that it contains cationic ammonium moiety capable of cationic exchange between initiator and cations naturally occurring between clay platelets. In prior art of GIANNELIS the ammonium compound is located on L₃ group, wherein L₃ group contains at least one carbon atom and is capable of polymerization as per applicant's requirements. Counter

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ion of GIANNELIS is chloride. The amount of the initiator is based on the molar equivalent of the cation exchange capacity and specific amount disclosed in GIANNELIS is 72.5 wt %.

The clay was provided in an aqueous dispersion mixed with initiator until cationic exchange was complete. Complete cation exchange included cations located between clay platelets as well as on the surface.

Monomer of the prior art of GIANNELIS is ethylenically unsaturated monomer, specifically styrene. Polymerization process of GIANNELIS allows control of molecular weight and polydispersity. Formation of block polymers is also envisaged, wherein the second monomer will be intrinsically different from the first monomer.

Removal of water solvent – as it is apparent from the disclosure of GIANNELIS, the reaction disclosed therein is a living free radical reaction. Once clay is modified with clay in aqueous dispersion, water has to be removed, otherwise, presence of water would kill the reaction. As evidenced in the examples of GIANNELIS, the polymerization of monomer is conducted in liquid monomer such as styrene and THF.

The applicants have further disclosed a proviso in their claims indicating that at least one group on G1 or G2 is alkyl that is not methyl. To further understand applicant's meaning of this proviso, as described in the specification, the applicants are utilizing ethyl. In view of the difference in having one group as methyl instead of ethyl, following is examiner's position:

It is apparent, that the instantly claimed all methyl substitution and that taught by applicant's three methyl and one ethyl are so close to each other that the fact pattern is similar to the one in In re Woodruff, 919 F.2d 1575, USPQ2d 1934 (Fed. Cir. 1990) or Titanium Metals Corp. of America v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed.Cir. 1985) where despite a

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“slight” difference in the ranges the court held that such a difference did not “render the claims patentable” or, alternatively, that “a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough so that one skilled in the art would have expected them to have the same properties”.

In light of the case law cited above and given that there is only a “slight” difference between the substitution of methyl disclosed by GIANNELIS and the one ethyl substitution disclosed in the present claims and further given the fact that no criticality is disclosed in the present invention with respect to the reactivity and formation of free radical, it therefore would have been obvious to one of ordinary skill in the art that the alkyl substitutions disclosed in the present claims is but an obvious variant of the alkyl substitutions disclosed in GIANNELIS, and thereby one of ordinary skill in the art would have arrived at the claimed invention.

In the light of the above disclosure it would have been obvious to one having ordinary skill in the art to utilize teachings of GIANNELIS and thereby arrive at the claims of the instant invention. The prior art of GIANNELIS discloses alkoxyamine initiator suitable for forming clay nanocomposite *via in situ* polymerization of ethylenically unsaturated monomers. Process of GIANNELIS would allow one of ordinary skill in the art to control molecular weight of the polymer as well as its polydispersity.

6. Claims 2-5, 7, 9, 10, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over GIANNELIS et al. in view of FRIED (US H1957 H).

The discussion of the disclosure of the prior art of GIANNELIS from paragraph 5 of this office action is incorporated here by reference.

The difference between the teachings of GIANNELIS and that of the present invention is recitation of more specific embodiments of initiators.

With respect to the above argument the prior art of FRIED discloses free radical polymerization with initiators based on pyridine and pyrrolidone (beginning col. 4).

Specifically, applicant's attention is drawn to formula VII and VIII of FRIED (col. 5). The specific formulas of FRIED satisfy requirements of IIa of the instant invention as well as that of IIa1, IIb, IIb1. In case of formulas based on IIb, the applicants allow presence of C=O substitution on nitrogen.

Compounds of FRIED disclose initiator and presence of N⁺ group is also envisaged. Such compounds are utilized to polymerize ethylenically unsaturated monomers *via* free radical polymerization, wherein the radical site is also at N-O·. Presence of envisaged N⁺ group would also allow anchoring of the initiator on clay platelets.

In the compounds of FRIED, R groups on the positions 2 and 6 of the pyrrolidone ring are disclosed to be C1-C4 alkyl groups, therefore the range of FRIED encompasses ethylenic substitution required by the present claims. Use of ethyl group would have resulted in optimized balance in terms of stability of the compounds, initiating activity and control of the polymerization (see WO 02/48109 for support page 4)

Monomers that can be polymerized utilizing initiators of FRIED include acrylic monomers such as MMA, styrene AA, as well as their combinations (col. 1).

Compounds of GIANNELIS and FRIED are viewed as functional equivalent. Both compounds serve as initiators to polymerize ethylenically unsaturated monomer *via* free radical polymerization. Such polymerization in both cases is afforded by presence of N-O \cdot . In addition use of ammonium compound in FRIED would allow one of ordinary skill in the art to anchor the initiator onto silicate as it is disclosed in GIANNELIS.

In the light of the above disclosure, it would have been obvious to one of ordinary skill in the art at the time of the instant invention to combine the teachings of GIANNELIS and FRIED with respect to use of initiators and thereby obtain the claimed invention. Such combination would provide system capable of free radical polymerization.

7. Claims 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over GIANNELIS et al. in view of WUNDERLICH (US 6,569,940).

The discussion of the disclosure of the prior art of GIANNELIS from paragraph 5 of this office action is incorporated here by reference.

The difference between the teachings of GIANNELIS and that of the present invention is recitation of more specific embodiments of initiators.

With respect to the above argument the prior art of WUNDERLICH discloses formula of claims 6 and 8 as depicted in claim 1 of the prior art. Specifically, formula (I), where X = NR₂, R₂ is hydrogen and R₁ is alkyl chain having 8-36 carbon atoms.

According to col. 1 of WUNDERLICH use of compound of formula I results in polymer that has low polydispersity, which is exactly what GIANNELIS is trying to achieve. In addition the free radical polymerization is also controlled. The substituents on the position 2 and 6 of the

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hetero ring are disclosed as alkyls having 1018 carbon atoms, which encompasses ethyle substituents claimed by the applicants.

In the light of the above disclosure, it would have been obvious to one having ordinary skill in the art at the time of the instant invention to functionalize initiator of WUNDERLICH and utilize it in the process of GIANNELIS. Such modification would still produce polymer having low polydispersity and wherein the polymerization process itself can be controlled.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katarzyna Wyrozebski whose telephone number is (571) 272-1127. The examiner can normally be reached on Mon-Thurs 8:30 AM-2:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on (571) 272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Katarzyna Wyrozebski/
Primary Examiner, Art Unit 1796
May 27, 2008